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THE OLE MISS ENGINEER

UNIVERSITY OF MISSISSIPPI STUDENT ENGINEERING JOURNAL

Volume 15, Number 4 APRIL, 1975

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Mrs. Debra Starnes Early of Memphis was selected as Outstanding Senior Engineering student at the University of Mississippi by the Mississippi Engineering Society recently. A Chemical Engineering student, Debbie received a plaque at a statewide meeting of the engineers' organization. Congratulating her is School of Engineering Dean Karl Brenkert.

ABOUT THE COVER

The School of Engineering has been authorized by the State Board of Trustees to offer the degree of Bachelor of Science in computer science. The authorization came January 16, and the degree will be available 90 days from that date, according to Dr. Darrell Ward, assistant professor of computer science, who is currently coordinating the program.

The computer science program is served by faculty members from various areas of the University. Besides Dr. Ward, a second computer science instructor recently has been hired. Several instructors are from other Engineering Departments, some are from the Math Department and two are from the School of Business.

The program's curriculum is based primarily on one prepared in 1968 by a group of computer scientists. Dr. Ward said that the curriculum set up by those scientists was math oriented, however, whereas the one at Ole Miss is not. (See Page 5).

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The Dean's Page

The history of this country has been a history of plentiful resources and a shortage of manpower. The first settlers had more land and more forests than were imaginable in Europe. So the constant stress was one of getting the greatest productivity per man without regard to the consumption of raw materials.

As the lumber industry developed, tools were invented whose purpose was to conserve the manpower without regard to the waste of raw materials. When lumbermen visited this country from Europe, they were amazed at the tremendous amount of waste that resulted from the extensive use of production tools.

The same was true of farms. Farmers in this country had large tracts of very fertile land, and their production was limited only by the amount of manpower they had available. So machines were developed to increase the output per man. Again, this was done without regard to the greatest utilization of the land or the maximum percentage of the crop that was harvested.

You can observe an example of this today when you see the large cotton pickers that harvest the fields in the South. You see many fields where a sizeable percentage of the crop is never harvested. Where there is a plentiful supply of manpower and a shortage of raw materials, the emphasis is on picking every boll of cotton.

This early history of our country is continuing right through to today and has made possible the highest standard of living the world has ever known. After all, the purpose was to get the greatest output per man and this meant that each man was able to produce more and, consequently, was able to enjoy more. Europeans have always felt that we wasted far too much and from their standpoint they were correct. In Europe there was a shortage of raw materials and an abundance of manpower, so they had an entirely different problem than we had. Of course, they solved it differently than we solved ours.

As the population has increased, the shortage of manpower has decreased. The population growth has also reduced the abundance of raw materials. This combination is being brought to a head in the petroleum shortage which will probably signal a turning point in the United States' development.

As the industrial nations gobble up more and more of the material resources of the world and as more and more people join in the enjoyment of this abundance, the surplus of raw materials disappears and the surplus of manpower emerges.

To overcome the shortage of raw materials, it is going to be necessary to recycle and use over and over again much of the raw materials that we now throw away as waste. It is going to be necessary to find substitute materials as the supply of some materials runs out. The solution to the energy shortage will come about because new forms of energy are discovered and made economically feasible. The only people qualified to do this are the engineers and scientists. If we do not do this, then our standard of living will decline and our ability to defend our freedom will diminish.

Thus, the only way we can hope to maintain our standard of living in such a world is through the application of science and technology. This gives science and technology today its greatest opportunity and challenge.

This is why it is so important that increased numbers of bright young individuals choose engineering as their profession. Without the commitment of the bright youth of America to engineering, we can not hope to preserve our freedom and our standard of living.

Karl Brenkert, Jr.
Dean of Engineering

Computer Science in the School of Engineering

Historical Overview—

In 1972 the School of Engineering was authorized by the Academic Vice Chancellor to initiate a computer science academic program. Dr. Samuel DeLeeuw, Chairman of Civil Engineering, was appointed as Coordinator of the Computer Science program. Dr. DeLeeuw also chaired a search committee that was charged with the responsibility of hiring a person with a computer science background. This committee recommended the hiring of a computer scientist in the summer of 1973 and in September of 1973 the School of Engineering added such a person to an excellent engineering faculty. In January, 1975, the second faculty member in computer science was added to the faculty, and applications are currently being accepted for another position in computer science.

The program initially consisted of an introductory course in computer science which served primarily as a service course for the School of Engineering and the Department of Mathematics. During the fall semester in 1973 a computer science curriculum applicable across University disciplines, was developed and implemented under an existing degree program, the Bachelor of Engineering degree. Several students already enrolled at the University got "hooked" on computers and computer science and contributed to the establishment of the program by enrolling in the degree program.

By the fall of 1974 enough interest had been generated in computer science to justify a request to the Board of Trustees for a separate degree in computer science. A proposal was prepared requesting a Bachelor of Science degree in computer science and submitted to the Board at their October meeting. In January, 1975, this degree was approved by the Board and the degree, Bachelor of Science in Computer Science, can now be conferred by the University of Mississippi.

In February, 1975, six courses at the graduate level in computer science were proposed and passed by the appropriate committees within the University. The first offerings at the graduate level will begin next fall and already considerable enthusiasm has materialized. The following depicts the chronology of the developments in addition to presenting some statistics of interest.

1972—Create a computer science program; O majors, O faculty.

Fall, 1973—First computer science faculty member hired; O majors, 3 sections of C.Sci. 101-100 students.

Spring, 1974—Bachelor of Engineering in Computer Science available; 15 majors, C. Sci. 102 offered.

Fall, 1974—Full-fledged course offcerings and B. S. degree proposed; 30 majors, 7 courses aplicable to computer science degree offered.

Spring, 1975—New faculty member added; B. S. approved and graduate course approved; Approximately 50 majors and minors; 10 courses applicable to computer science degree offered.

Scope of the Program—

The program in computer science is designed to accomplish three primary objectives:

(1) provide courses of a service nature for other departments and curricula

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within the University
(2) educate students interested in pursuing computer science as a career path
(3) provide the basics necessary for continued education at the graduate level in computer science

In the implementation of the computer science program, the cooperative efforts of several departments have emerged in the form of faculty assistance. Due to this high degree of cooperation computer science students receive quality instruction from faculty members in computer science, engineering, mathematics and business.

The program in computer science permits a high degree of flexibility in the choice of a minor area and in an area of emphasis within the computer science area. Currently, students with minors in such diverse areas as accounting, mathematics, history and education (to name a few) are enrolled as computer science majors.

Degrees Available and Associated Curriculum—

The two degrees offered at the undergraduate level both consist of a 126-hour program. The B.S. degree in computer science requires that a student minor in a scientific or technical discipline whereas the B.E. program permits a minor subject only to the approval of an advisor. These two degrees routes are presented in Figure 2. Figure 3 lists the courses offered within the computer science program.

At the graduate level, an existing degree, Master of Science in Engineering Science is available to the person interested in advanced work in computer science.

CSCI 101-Computer Programming I
CSCI 102-Computer Programming II
CSCI 201-Data Structures
CSCI 231-Computers and Society
CSCI 301-Principles of Digital Systems
CSCI 321-Computer Organization
CSCI 323-Systems Programming
CSCI 343-Systems Design and Analysis
CSCI 345-Information Storage & Retrieval
CSCI 405-Computer Simulation
CSCI 421-Programming Languages
CSCI 423-Operating Systems
CSCI 425-Compiler Construction
CSCI 441-Data Processing Systems Organization
CSCI 443-On Line & Timesharing Systems
CSCI 445-Educational Data Systems
CSCI 487-Problems in Computer Science

Figure 3. List of computer science courses

Facilities—

In the spring of 1973 the University of Mississippi purchased a general purpose timesharing computer, the DEC system 10. This is probably the most popular timesharing computer on the market. The computer hardware purchased by the University of Mississippi provides facilities for faculty and students that are unmatched in this area of the country and are undoubtedly among the finest academic facilities in the U. S. The potential in this area is absolutely unlimited.

The capability of interacting directly with a computer system is a very desirable feature in an academic environment. (See October, 1974, Ole Miss Engineer). This allows students to conserve much time and effort in utilizing and directing the computer. Presently, in the School of Engineering, there are nine to twelve computer terminals available to students interested in an interactive dialogue with the computer system. These facilities will no doubt be upgraded significantly in the very near future; this is reflected by the purchase of four new CRT-type terminals scheduled to arrive in early May.

Figure 2. Curricula for Computer Science Degrees

Courses	Semester Hours Degree: B.S.	B.E.
English 101, 102, 201, 202	12	12
Social Sciences' (two subjects, 6 hours each, chosen from Black Studies, classical civilization, communication disorders, economics, history, philosophy, or religions, poltical science, psychology and either anthropology or geography or sociology).	12	12
Natural Sciences (two subjects, 6 hours each, chosen from: biology, chemistry, geology, mathematics, and either astronomy or physics or physical science. None of these hours may be taken in your minor area.)	12	12
Humanities	12	12
C. Sci. 101, 102, 201, and 487	12	12
El. E. 335	3	3
Computer Science Major	27	21
Minor: Physics, Mathematics, Chemistry, Biology, or Engineering for B. S.; Selected for B.E.	18	18
Electives	18	24
Total Hours	126	126

Conclusion—

Due to the tremendous technological advances in computer hardware and software in the last thirty years, it is an absolute necessity for the problem solvers in our society to be familiar with computers and their capabilities. The career opportunities that exist in computer science and computer-related areas continue to be excellent with the projected opportunities just as promising.

The School of Engineering is committed to a program of excellence in teaching and research in computer science and is dedicated to providing an education that will permit our students to make a contribution to the solution of the varied and complex problems of today's society.

Alumnus Lectures

Guy H. Watkins, General Manager, Louisiana Division of Dow Chemical, U. S. A., presented a special lecture at the University February 5, 1975. The talk entitled, "Dow Chemical and Pollution Abatement", was well attended by students and faculty from throughout the University community.

Mr. Watkins, a 1948 graduate of the University of Mississippi, was the 30th person to receive a B.S. degree in Chemical Engineering from Ole Miss. He joined Dow in 1950 as an engineer in the Texas light hydro-carbon department, eventually becoming a superintendent in that department. In 1955 he was named superintendent of the new polyethylene department. Named section superintendent of polyethylene production in the Texas Division in 1959, he was appointed in 1963 to the new position in Midland of manager of polyolefins for Dow molding materials in the plastics department.

In 1965 Watkins was named production manager of Dow Manufacturing operations in The Netherlands. In 1966 he was named manager of production in Dow Europe. After seven years of service as the senior Dow representative in The Netherlands, Mr. Watkins returned to the United States where, in the fall of 1973, he was named General Manager of the Louisiana Division of Dow Chemical U.S.A.

The Engineering Curriculum

The courses that make up the curricula of the various engineering programs of the School of Engineering can be categorized into four groups. They are: (1) physical sciences and mathematics, (2) social sciences and humanities, (3) general engineering, and (4) specific professional engineering discipline (or courses related to non-engineering areas of emphasis.)

The physical sciences and mathematics provide the basic foundation knowledge and tools for the effective study and understanding of engineering course material. They are therefore pre-requisite to most engineering courses and are normally completed during the engineering students' freshman and sophomore years of college. The eight hours of chemistry, eight hours of physics and fifteen hours of calculus and differential equations make up about one-fourth of the student's total program.

The social sciences and humanities are an indispensable part of the engineer's education. They enable the engineer to become a part of, to communicate with, and to attain a broad understanding of the desires, needs, and aspirations of society, thus allowing the engineer to complete designs and make decisions on more than just technical considerations. The University of Mississippi engineering student must complete from twenty-four to thirty hours of study chosen from such courses as English, history, political science, philosophy, psychology, sociology, economics, classics, speech, music, art, and modern languages. This comprises another one-fourth of the program of study.

All engineering students, regardless of their specific area of study, are required to complete thirty hours of general engineering courses. These courses provide them with broad foundation engineering knowledge in such areas as computer programming, engineering mechanics, electric circuit theory, thermodynamics, solid state theory, systems, transport phenoma, graphics, and technical communications, and provide the third one-fourth of the program.

The remaining one-fourth of the student's courses are in a specific professional engineering discipline (chemical, civil, electrical, geological, or mechanical engineering) or, are courses related to the selected non-engineering area of interest such as the sciences, medicine, law, business, dentistry or journalism.

ADVISORS CONFERENCE — Participants in the annual joint Pre-Engineering and Pre-Pharmacy Advisers Conference held recently at the University of Mississippi were: [from left] Engineering Dean Karl Brenkert; Dr. Charles E. Noyes, assistant vice chancellor for Academic Affairs; Shelby L. Harris, Mathematics Instructor, East Central Junior College, Decatur; Zula Glenn, Mathematics Instructor at Northwest Mississippi Junior College, Senatobia; Woodson Earle, Mathematics Instructor, Holmes Junior College, Goodman; and John Grant, Mathematics and Science Instructor, Pearl River Junior College, Poplarville.

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Programs of the School of Engineering

The programs of study offered by the School of Engineering stress the engineering sciences and are therefore based on concepts as well as current technology. The four-year Bachelor of Science curricula in Chemical, Civil, Electrical, Geological, and Mechanical Engineering are designed to prepare students for the practice of the profession of engineering. The Bachelor of Science in Environmental Geology prepares students for environmental work.

The Bachelor of Science in Computer Science is designed to educate students interested in pursuing computer science as a career.

A new and innovative degree offered by the School of Engineering is the four-year Bachelor of Engineering (B.E.) The curricula are extremely flexible and are designed to provide students who may not plan to practice engineering professionally the opportunity to gain an understanding of scientific and technical knowledge which will enhance their career objectives in such areas as science, medicine, law, computer science, management and sales. The curricula are individually designed to meet each student's needs but in general provide three paths of study: (1) a pre-professional program that stresses technology as well as breadth of education; (2) a terminal program that provides a broad education with emphasis on science and technology; and (3) a computer science program.

Also available is the Master of Engineering program which is for those engineering students who desire a greater breadth than that offered by the Bachelor of Science curricula. Normally, this program consists of one year of professional study beyond the Bachelor of Engineering degree. The School of Engineering offers, through the Graduate School, the Master of Science and Doctor of Philosophy degrees in Engineering Science and the Doctor of Philosophy in Biomedical Engineering.

The Engineers' Council for Professional Development, the national engineering accrediting agency, has accredited the Bachelor of Science curricula in Chemical, Civil, Electrical, Geological and Mechanical Engineering.

Electrical Engineering Activities

Dr. Curtis Johnson, one of the nation's leading experts on electromagnetic theory was the third speaker in the University Electrical Engineering Department's 1974-75 Lecture Series on Electromagnetic Theory and Applications. Dr. Johnson, professor and chairman of the Department of Bioengineering at the University of Utah, spoke at 1:30 p.m. on March 20 in Anderson Hall Auditorium. His topic was "Biological Effects and Medical Applications of Electromagnetic Radiation." His talk dealt with microwave hazards to biological systems using examples such as microwave ovens, x-ray radiation from television sets, and high-powered transmission lines.

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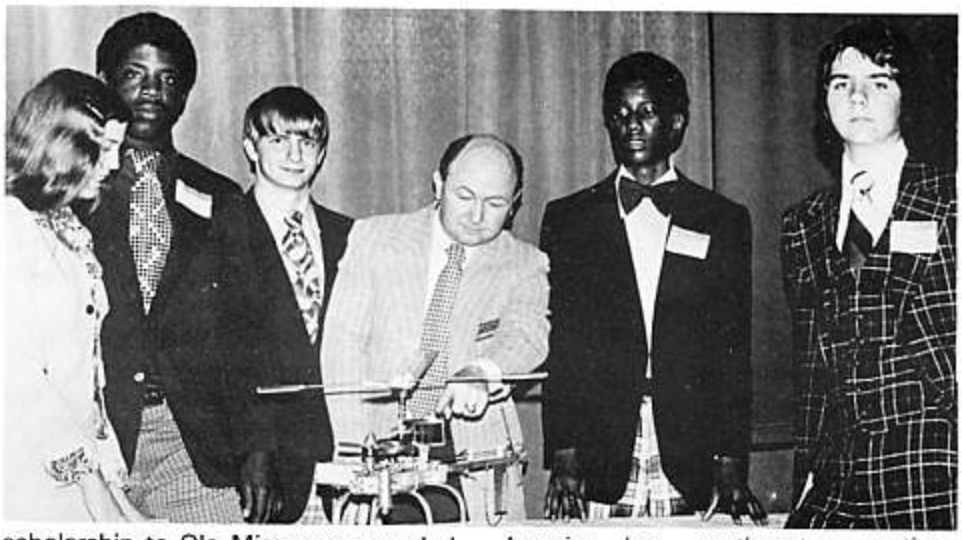
SYMPOSIUM AT OLE MISS — High school students selected to present papers at the Mississippi Junior Science and Humanities Symposium at the University of Mississippi March 14 confer with Professor Damon Wall [third from right], Director of the Engineering Experiment Station and Chairman of the Paper Selection Committee of the Symposium. Students and their paper topics are: [from left] Linda R. Monk, Warren Central H.S., Vicksburg, "The Effects of Color Harmonies on Reversible Patterns,"; Lynn R. Jefferson, St. Aloysius H.S., Vicksburg, "Fixed Rotor Helicopters: A Performance Study"; Gary K. Dearing, West Point H.S., West Point, "Mathematical Modeling Using the Computer"; J. Steve Hurst, Tylertown H.S., Tylertown, "A Comparative Study of the Effects of Rabbit Anti-Mouse Lymphocyte Serum and Saline and Normal Rabbit Serum on Leukemia and Tumors in Mice"; and Scott H. McPherson, Warren Central H.S., Vicksburg, "The Effect of Oxalic Acid on Mercury Poisoning in Mice." A $2,000 scholarship to Ole Miss was awarded to Steve Hurst for the winning presentation. He will present his paper at the National Symposium at the U. S. Military Academy in New York in May and will be accompanied by the other four finalists.



Program Participants

Geology and Geological Engineering faculty members who will present papers during the 24th annual meeting of the Geological Society of America, Inc., southeastern section, in Memphis April 9-12 are: Dr. William R. Reynolds, technical program chairman for the meeting, Dr. Thomas H. Waller and Professor Fred Followill. Department Chairman Velon Minshew and Professor of Secondary Education Harold Hein will be participants during a National Association of Geology Teachers symposium on Thursday. The meeting is co-sponsored by Ole Miss and Memphis State University.

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Mechanical Engineering Career Outlook

Though the unemployment rate is climbing, the career outlook for mechanical engineers is at its best in 10 years, according to Dr. John Fox, chairman of Mechanical Engineering at the University.

With energy companies tooling up for oil explorations and increased energy production, the associated mechanical equipment development and construction is on the increase and mechanical engineers are in a buyer's market.

"Nearly every industry that interviews on campus will interview mechanical engineers," said Dr. Fox, also professor of Mechanical Engineering. "Somebody's got to develop and design new energy producing companies. These companies are not out of work, so they are really looking for mechanical engineers, particularly in the southeast."

Mechanical engineering graduates may choose a career in a wide variety of industries other than those associated with energy, including automotive, ship building, general construction, farm and heavy equipment and aerospace. Salaries range from $1,200 to $1,400 a month, Dr. Fox said, and the field is wide open for women.

"I think mechanical engineers can work almost any place," he said. "They are very employable. They may be employed in research, development, administration, operations and maintenance."

Subjects covered by students in mechanical engineering at Ole Miss include solid and fluid mechanics, thermodynamics, (conversion of heat into work), electricity and the design of components and systems. Any persons considering a career in engineering should like math, Dr. Fox said.

"The motivation for most engineers is that there is something that has to be made, built, changed or improved, so he is looking for information to apply to accomplish this."

ENGINEERING EMPLOYMENT — The recent College Placement Council survey of employers found offers to engineers up an average of 9 per cent this year. Among the openings anticipated for B.S. candidates by the 700 employers responding, those in engineering amounted to 49 per cent of the total engineering baccalaureates projected for 1974-75. Anticipated openings in the humanities and social sciences, meanwhile, account for only 4 per cent of the baccalaureates who will graduate in these curricula.

Frank A. Anderson Endowment Fund

Union Camp Corporation of Savannah, Georgia, recently recognized the outstanding contributions to engineering education of Dr. Frank A. Anderson, Associate Dean of Engineering and Chairman of the Chemical Engineering Department, with a $1,000 contribution to the Frank A. Anderson Engineering Endowment Fund. The presentation was made by D. S. Oliver, Manager of Selection and Training for Union Camp.

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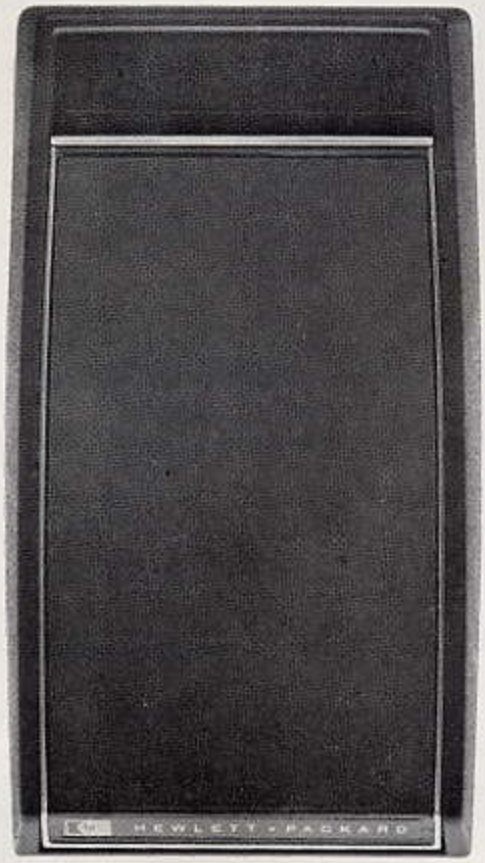

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Programs of the School of Engineering

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The Bachelor of Science in Computer Science is designed to educate students interested in pursuing computer science as a career.

A new and innovative degree offered by the School of Engineering is the four-year Bachelor of Engineering (B.E.) The curricula are extremely flexible and are designed to provide students who may not plan to practice engineering professionally the opportunity to gain an understanding of scientific and technical knowledge which will enhance their career objectives in such areas as science, medicine, law, computer science, management and sales. The curricula are individually designed to meet each student's needs but in general provide three paths of study: (1) a pre-professional program that stresses technology as well as breadth of education; (2) a terminal program that provides a broad education with emphasis on science and technology; and (3) a computer science program.

Also available is the Master of Engineering program which is for those engineering students who desire a greater breadth than that offered by the Bachelor of Science curricula. Normally, this program consists of one year of professional study beyond the Bachelor of Engineering degree. The School of Engineering offers, through the Graduate School, the Master of Science and Doctor of Philosophy degrees in Engineering Science and the Doctor of Philosophy in Biomedical Engineering.

The Engineers' Council for Professional Development, the national engineering accrediting agency, has accredited the Bachelor of Science curricula in Chemical, Civil, Electrical, Geological and Mechanical Engineering.

Electrical Engineering Activities

Dr. Curtis Johnson, one of the nation's leading experts on electromagnetic theory was the third speaker in the University Electrical Engineering Department's 1974-75 Lecture Series on Electromagnetic Theory and Applications. Dr. Johnson, professor and chairman of the Department of Bioengineering at the University of Utah, spoke at 1:30 p.m. on March 20 in Anderson Hall Auditorium. His topic was "Biological Effects and Medical Applications of Electromagnetic Radiation." His talk dealt with microwave hazards to biological systems using examples such as microwave ovens, x-ray radiation from television sets, and high-powered transmission lines.

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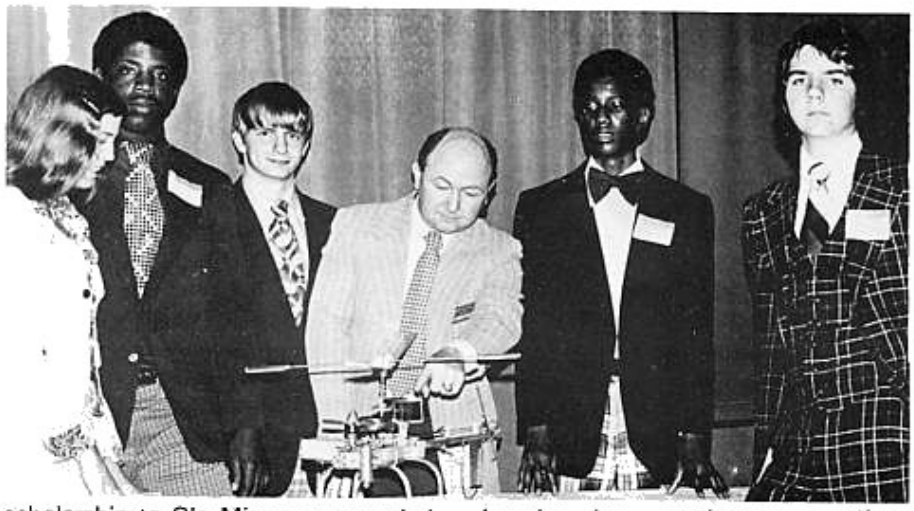
SYMPOSIUM AT OLE MISS — High school students selected to present papers at the Mississippi Junior Science and Humanities Symposium at the University of Mississippi March 14 confer with Professor Damon Wall [third from right], Director of the Engineering Experiment Station and Chairman of the Paper Selection Committee of the Symposium. Students and their paper topics are: [from left] Linda R. Monk, Warren Central H.S., Vicksburg, "The Effects of Color Harmonies on Reversible Patterns,"; Lynn R. Jefferson, St. Aloysius H.S., Vicksburg, "Fixed Rotor Helicopters: A Performance Study"; Gary K. Dearing, West Point H.S., West Point, "Mathematical Modeling Using the Computer"; J. Steve Hurst, Tylertown H.S., Tylertown, "A Comparative Study of the Effects of Rabbit Anti-Mouse Lymphocyte Serum and Saline and Normal Rabbit Serum on Leukemia and Tumors in Mice"; and Scott H. McPherson, Warren Central H.S., Vicksburg, "The Effect of Oxalic Acid on Mercury Poisoning in Mice." A $2,000 scholarship to Ole Miss was awarded to Steve Hurst for the winning presentation. He will present his paper at the National Symposium at the U. S. Military Academy in New York in May and will be accompanied by the other four finalists.



Program Participants

Geology and Geological Engineering faculty members who will present papers during the 24th annual meeting of the Geological Society of America, Inc., southeastern section, in Memphis April 9-12 are: Dr. William R. Reynolds, technical program chairman for the meeting, Dr. Thomas H. Waller and Professor Fred Followill. Department Chairman Velon Minshew and Professor of Secondary Education Harold Hein will be participants during a National Association of Geology Teachers symposium on Thursday. The meeting is co-sponsored by Ole Miss and Memphis State University.

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Mechanical Engineering Career Outlook

Though the unemployment rate is climbing, the career outlook for mechanical engineers is at its best in 10 years, according to Dr. John Fox, chairman of Mechanical Engineering at the University.

With energy companies tooling up for oil explorations and increased energy production, the associated mechanical equipment development and construction is on the increase and mechanical engineers are in a buyer's market.

"Nearly every industry that interviews on campus will interview mechanical engineers," said Dr. Fox, also professor of Mechanical Engineering. "Somebody's got to develop and design new energy producing companies. These companies are not out of work, so they are really looking for mechanical engineers, particularly in the southeast."

Mechanical engineering graduates may choose a career in a wide variety of industries other than those associated with energy, including automotive, ship building, general construction, farm and heavy equipment and aerospace. Salaries range from $1,200 to $1,400 a month, Dr. Fox said, and the field is wide open for women.

"I think mechanical engineers can work almost any place," he said. "They are very employable. They may be employed in research, development, administration, operations and maintenance."

Subjects covered by students in mechanical engineering at Ole Miss include solid and fluid mechanics, thermodynamics, (conversion of heat into work), electricity and the design of components and systems. Any persons considering a career in engineering should like math, Dr. Fox said.

"The motivation for most engineers is that there is something that has to be made, built, changed or improved, so he is looking for information to apply to accomplish this."

ENGINEERING EMPLOYMENT — The recent College Placement Council survey of employers found offers to engineers up an average of 9 per cent this year. Among the openings anticipated for B.S. candidates by the 700 employers responding, those in engineering amounted to 49 per cent of the total engineering baccalaureates projected for 1974-75. Anticipated openings in the humanities and social sciences, meanwhile, account for only 4 per cent of the baccalaureates who will graduate in these curricula.

Frank A. Anderson Endowment Fund

Union Camp Corporation of Savannah, Georgia, recently recognized the outstanding contributions to engineering education of Dr. Frank A. Anderson, Associate Dean of Engineering and Chairman of the Chemical Engineering Department, with a $1,000 contribution to the Frank A. Anderson Engineering Endowment Fund. The presentation was made by D. S. Oliver, Manager of Selection and Training for Union Camp.

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